

**Fill in the gaps using the given words.**

### **Technology monitor**

high-tension / invisible / architects / detrimental / metal-lattice / direct / entrances / insulators / electricity / efficient / futile / guilty / electricity grid / eyesore / losses / project / transmit / transmission lines / alternating / question / objections / state-owned

A PYLON is supposed to be a beautiful thing. In ancient Egypt, pairs of tapering stone towers called pylons marked the (1) \_\_\_\_\_ of temples. Christian (2) \_\_\_\_\_ borrowed the idea for the twin towers above the façades of many Gothic cathedrals. Whoever thought of appropriating the word for the ugly (3) \_\_\_\_\_ structures that carry (4) \_\_\_\_\_ power lines over the countryside was therefore (5) \_\_\_\_\_ of both a public-relations triumph and an act of etymological vandalism. The latter, however, may soon be redeemed. The latest generation of (6) \_\_\_\_\_ pylons are, in the eyes of some, at least, things of beauty in their own right.

The pylons in (7) \_\_\_\_\_ have been designed by engineers at TenneT, the firm that runs the Netherlands' national (8) \_\_\_\_\_, in collaboration with KEMA, a Dutch research company. Instead of a single lattice tower, the cables are supported by two elegant steel poles up to 65 metres high. There are no arms. The six cables that pass from one pylon to another are each borne by two (9) \_\_\_\_\_ attached to the poles. The resulting arrangement, though hardly (10) \_\_\_\_\_, is reasonably elegant. As much to the point, though, it has technological advantages. Though no harm has been proven from them, conventional pylon cables, which (11) \_\_\_\_\_ a three-phase alternating current, generate a strong electric field and a continuous buzz of low-frequency radio waves which some people who live near them fear might be (12) \_\_\_\_\_ to their health.

TenneT's pylons should help allay that fear. Carrying all the cables in a "stack" between the poles, rather than hanging them separately on outward-facing arms, allows them to be arranged in a way that causes the individual fields generated by each cable to cancel each other, weakening the overall field around the pylons. The result is far less low-frequency radiation. The combination of being less of an (13) \_\_\_\_\_ and producing less electrical smog should, TenneT hopes, soften (14) \_\_\_\_\_ to the construction of new overhead power lines.

That is important for two reasons. One, the alternative—burying high-tension lines—is expensive and largely (15) \_\_\_\_\_. The cost of putting a cable underground is between four and ten times as much as that of carrying it on a pylon. On top of that, the field generated by an (16) \_\_\_\_\_ current interacts with the ground more strongly than it does with the air. This creates losses 40 times higher in a buried cable than in an aerial one. Unless the long-distance-transmission system were converted to (17) \_\_\_\_\_ current (which reduces transmission (18) \_\_\_\_\_, but brings problems of its own), burial of transmission lines is not a serious option. The second reason TenneT's pylons may be important is that despite these problems a lot of new long-distance-(19) \_\_\_\_\_ are going to have to be constructed, soon. Wind power from the North Sea and the Atlantic Ocean will require that. So, more speculatively, will the idea of generating solar power in North Africa and transmitting it to Europe.

In the Netherlands alone, TenneT says, more than 400km of new lines are needed. In Germany, the (20) \_\_\_\_\_ energy agency, DENA, reckons that figure is more than 3,500km. At the most recent meeting of the European Council the leaders of the European Union's member states acknowledged that Europe needs a completely new power grid, a (21) \_\_\_\_\_ they reckon will cost about €200 billion (\$270 billion). The overhead power problem is thus going to have to be solved one way or another.

In truth, of course, no pylon is ever going to be a more attractive feature of the countryside than no pylon. But if pylons have to be built—which they do—then something elegant and (22) \_\_\_\_\_ is the least bad way of doing it.